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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,610	11/20/2003	Yusuke Konno	4276-0105P	7138
2292 7590 05/02/2007 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			EXAMINER AKHAVANNIK, HADI	
			ART UNIT 2624	PAPER NUMBER
			NOTIFICATION DATE 05/02/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

**Office Action Summary**

Application No.

10/716,610

Applicant(s)

KONNO ET AL.

Examiner

Hadi Akhavannik

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,7,9,10 and 15 is/are rejected.
- 7) ☒ Claim(s) 3-6,8,11-14 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/20/03, 3/03/04</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-2, 7, 9-10, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collet-Beillon (5574801) in view of Sepai et al. (5455870, referred to as "Sepai" herein) and further in view of Wagner et al. (paper titled "Evaluation of three template matching algorithms for registering images of the eye", referred to as "Wagner" herein).

Regarding claim 1, Collet-Beillon discloses a method for inspecting a bump electrode comprising the steps of: illuminating a substrate in an oblique direction where balls are arrayed by using an annular type illumination device (see figures 8-9 and column 4 line 60 to column 5 line 5 as it discloses illuminating a ball grid array at an angle) ;

photographing the substrate from above the substrate (figure 8 item 40 discloses a camera that is located above the substrate) ;

Collet-Beillon does not disclose correcting for luminance, although he does disclose a calibration step.

Sepai discloses correcting a gradation of the photographed image of an annular pattern by using a function with a saturation characteristic (see figure 8A, item 114 and column 11 line 45 to column 12 line 52 as it discloses correcting an image);

It would have been obvious at the time of the invention to one of ordinary skill in the art to include in Collet-Beillon a luminance correction means as taught by Sepai. The reason for the combination is because it makes for a more robust system can improve image quality by removing erroneous data through thresholding.

Neither Collet-Bellon nor Sepai disclose segmenting and pattern matching by using normalized correlation coefficient.

Wagner discloses making a segmented image which includes an object of interest (see section II and figure 1. In figure 1 he discloses selecting a search area S. This acts as the segmented image because the system only searches that segmented area);

and determining whether each bump electrode (in this case it is the object of interest or eyes) is an acceptable product or not by pattern matching by calculating a normalized correlation coefficient between the segmented image and a template image prepared in advance (section III titled "similarity measures" and figure 1 disclose using a template and normalized search coefficients to calculate the similarity).

It would have been obvious at the time of then invention to one of ordinary skill in the art to include in Collet-Bellon and Sepai a template matching means as taught by Wagner. The reason for the combination is because it allows for a popular and straight forward way for one to match templates (see motivation by Wagner in section III).

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2. Regarding claim 2, Sepai discloses using luminance values in the rejection of claim 1 and section III of Wagner discloses using gray level values for template matching. Sepai also discloses using math, such as thresholding, to remove bad data.

Regarding claim 7, figure of Wagner discloses all aspects of claim 7 as it shows using one template.

Regarding claims 9-10 and 15. These are the apparatus claims of 1-2 and 7 and the rejection of claims 1-2 and 7 disclose all aspects of claims 9-10 and 15.

#### ***Allowable Subject Matter***

3. Claims 3-6, 8, 11-14, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3-4, 8, 11-12 and 16 are allowable because they disclose finding the size of the bump electrode by using templates.

Claims 5-6, and 13-14 are allowable because of their equations.

#### ***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Li (6289117), Michael et al. (6173070) each disclose ball grid array inspection.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hadi Akhavannik whose telephone number is 571-272-8622. The examiner can normally be reached on 10:30-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (571)272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HA  
4/18/07



JOSEPH MANCUSO  
SUPERVISORY PATENT EXAMINER